





basic designation only.

U.S. AIR FORCE TECHNICAL ORDERS (TO)

TO 31W3-10-12

(1986) AF Communications Service Standard  
Installation Practices, Outside Plant  
Cable Placement

1.2 GENERAL REQUIREMENTS

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NOTE: If section 26 00 00.00 40 GENERAL ELECTRICAL  
PROVISIONS is not included in the project  
specification, applicable requirements therefrom  
should be inserted and the following paragraph  
deleted.  
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Section 26 00 00.00 40 GENERAL ELECTRICAL PROVISIONS applies to work  
specified in this section.

1.3 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions  
in Section 01 33 00 SUBMITTAL PROCEDURES and edit  
the following list to reflect only the submittals  
required for the project. Submittals should be kept  
to the minimum required for adequate quality control.  
  
A "G" following a submittal item indicates that the  
submittal requires Government approval. Some  
submittals are already marked with a "G". Only  
delete an existing "G" if the submittal item is not  
complex and can be reviewed through the Contractor's  
Quality Control system. Only add a "G" if the  
submittal is sufficiently important or complex in  
context of the project.  
  
For submittals requiring Government approval on Army  
projects, a code of up to three characters within  
the submittal tags may be used following the "G"  
designation to indicate the approving authority.  
Codes for Army projects using the Resident  
Management System (RMS) are: "AE" for  
Architect-Engineer; "DO" for District Office  
(Engineering Division or other organization in the  
District Office); "AO" for Area Office; "RO" for  
Resident Office; and "PO" for Project Office. Codes  
following the "G" typically are not used for Navy,  
Air Force, and NASA projects.  
  
Choose the first bracketed item for Navy, Air Force  
and NASA projects, or choose the second bracketed  
item for Army projects.  
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Government approval is required for submittals with a "G" designation;  
submittals not having a "G" designation are [for Contractor Quality Control

approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-03 Product Data

Manufacturer's catalog data shall be submitted for the following items:

Inner Duct  
Duct Seals  
Cable Rack Hooks  
Cable Ties

### PART 2 PRODUCTS

#### 2.1 INNER DUCT

Inner duct shall be [Sterling Engineered Products, Inc., Part No. PE5007] [\_\_\_\_\_] or equal, and installed in continuous lengths.

Inner duct shall be four channels of polyethylene with a nominal 25 millimeter 1 inch size.

#### 2.2 DUCT SEALS

Duct seal shall be [Insta-Foam] [\_\_\_\_\_] or equal. Fire stop sealant shall be silicon foam [Insta Fire Seal] [\_\_\_\_\_] or equal. Both are manufactured by [Insta-Foam Products, Inc., Joliet, Illinois, 60435] [\_\_\_\_\_] or approved equal.

#### 2.3 CABLE RACK HOOKS

Contractor shall provide the necessary cable rack hooks compatible with the existing cable racks to support the cable and its associated splice cases in manholes, vaults, and terminal rooms. These cable hooks shall be hot-dipped galvanized, cut from channel steel with rounded top surface 38 millimeter 1-1/2 inches wide, [A.B. Chance Co. No. 1133] [\_\_\_\_\_] or approved equal.

#### 2.4 CABLE TIES

Cable ties shall be PVC material made by [Ty-Rap] [\_\_\_\_\_] or equal.

### PART 3 EXECUTION

#### 3.1 DUCTS AND INNER DUCT

The assigned 100 millimeter 4 inch existing duct or conduits shall be rodded, cleaned, and tested for alignment in a manner equivalent to that specified in TO 31W3-10-12 before pulling in the inner duct. Contractor shall have a second winch line connected to the trailing end of any duct cleaning/aligning device to facilitate removal in the event such device becomes stuck. Under no circumstances will the Contractor be allowed to abandon a stuck cleaning/aligning device in a vacant duct.

When immovable objects are encountered in the duct run, items such as duct scoops, pickup, jar hammers and wire brushes shall be used with chains and

cleaners to clear duct in accordance with TO 31W3-10-12. Mechanical rodding equipment with proper sized cutting tools and water pressure equipment shall be used as necessary to clean and align the defective or blocked orangeburg or other duct.

Inner duct shall be pulled through existing duct-manholes system in continuous sections. Exact required inner duct lengths shall be field-measured by the Contractor. Inner duct shall be continuous with no splices, joints, couplings, or connections of any type. Inner duct shall be sealed with polyurethane foam, or approved equal and placed between the inner duct and duct. In those inner duct in which cables are placed, this material shall also be placed between the cable and the inner duct. Only one cable shall be installed in a given inner duct. Existing and new unoccupied inner duct shall be trimmed leaving 300 millimeter 12 inches exposed in manholes and floor vaults and sealed with urethane foam.

### 3.2 INSTALLATION

The assigned 100 millimeter 4-inch duct shall be rodded, cleaned, and tested for alignment in accordance with TO 31W3-10-12, before installing the inner duct. Mechanical equipment with winch lines shall be used at both ends of the section to be rodded which will work the line back and forth through the duct. The 100 millimeter 4-inch existing concrete reinforced duct system at KSC does not contain pulling lines and may contain orangeburg material. Some sections may require mechanical rodding equipment with cutting tools and water pressure equipment to clean and align the duct.

### 3.3 CABLE RACK HOOKS

Cable rack hooks shall be used to support and secure the cable. Where the specified method of support is not indicated, adequate support and fasteners shall be used to secure the cable in a stable position.

Contractor shall provide two cable rack hooks per manhole as a minimum.

### 3.4 CABLE SUPPORT

Where the specific method of support is not indicated, adequate support and fasteners shall be used to secure the cable in a stable position.

### 3.5 CABLE TIES

Cable Ties: Contractor shall provide the necessary length and width cable ties to properly secure and support the cable, splice cases and associated items.

-- End of Section --